

For example, although the Office Action contends that Kajiura discloses a field switching circuit for supplying field current to the field coil in a controlled manner, Kajiura does not disclose the switching circuit connected to the field coil connected to the field coil as recited in the claims (see Fig. 40 of Kajiura). Additionally, the switching elements 27a-27f in Kajiura do not supply field current to the field coil in a controlled manner.

The Office Action contends that switching elements 27a-27f of Kajiura corresponds to the field current switching circuit recited in the claims. However, the alternator in Kajiura uses MOS-FETs 27a-27f as switching elements having diodes 26a-26f formed integrally therein that function in the same manner as switching elements 17a-17f of Kajiura which are transistors (col. 12, lines 33-42). The elements 17a-17f function so that the conducting direction is opposite to that of the conducting direction of diodes of the full wave rectifying circuit (see col. 5, lines 47-50 of Kajiura).

The Office Action further alleges that the control circuit 11 corresponds to the field voltage detecting circuit for detecting field voltage induced in the field coil when the field coil is not supplied with field current. However, the control circuit 11 of Kajiura merely controls the field circuit and detects the voltage of the battery 15, (col. 6, lines 17-18). Thus, the control circuit 11 does not detect the voltage induced in the field coil.

The Office Action further alleges that the phase control circuit of Kajiura is equivalent to the switch control circuit recited in the claims. However, the phase control circuit 10 of Kajiura controls the switching elements 17a-17f. Accordingly, Kajiura does not disclose the features recited in claims 1-4.

The Office Action rejects claims 5-19 under 35 U.S.C. §103(a) as unpatentable over Kajiura in view of U.S. Patent No. 5,710,471 to Syverson et al. (Syverson). The rejection is respectfully traversed.

Applicants assert that neither Kajiura or Syverson, whether considered alone or in combination, disclose or suggest a voltage regulator of a vehicle AC generator ... comprising ...

a field voltage detecting circuit for detecting field voltage induced in the field coil when the field coil is not supplied with field current, as recited in claim 5, or a vehicle AC generator comprising means for detecting the rotation speed of the rotor according to the voltage induced in the field coil when the field coil is not supplied with field current, as recited in amended claim 15.

Furthermore, as discussed above, Kajiura does not disclose any of a field current switching circuit, a field voltage detecting circuit or a switch control circuit. In addition to these deficiencies, the Office Action admits that Kajiura does not disclose a power circuit for supplying electric power to the control circuit, a power drive circuit for controlling supply of the electric power to the control circuit and first means for detecting rotation speed of the rotor, wherein the power drive circuit supplies electric power from the power circuit to the control circuit if the rotation speed becomes as high as a predetermined speed.

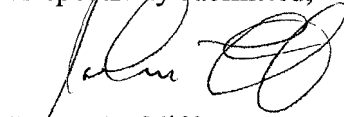
To overcome the admitted deficiencies, the Office Action combines Syverson and alleges that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the hybrid alternator disclosed by Syverson on the voltage regulator of Kajiura, thus rendering claims 5-19 obvious. However, Applicants assert that in addition to the admitted deficiencies, Syverson does not disclose a field voltage detecting circuit for detecting field voltage induced in the field coil when the field coil is not supplied with the field current or a first means for detection rotation speed of the rotor according to the field voltage, as recited in claim 5. Furthermore, Syverson does not provide a means for detecting rotation speed of the rotor according to the voltage induced in the field coil when the field coil is not supplied with a field current, or a switch control circuit connected to said means, for providing the switching circuit with electric power to be supplied to the field coil when the detected rotation speed becomes as high as a predetermined speed, as recited in claims 15-19. Rather, Syverson merely discloses an alternator having both permanent magnets and a field coil, and a voltage regulator for controlling the polarity of the current

supplied to the field coil. Thus, neither Kajiura or Syverson, whether considered alone or in combination disclose all of the features recited in claims 5-19.

In view of the foregoing, reconsideration of the application is requested. It is submitted that the claims as presented herein patentably distinguish over the applied references and fully meet the requirements of 35 U.S.C. §112. Accordingly, allowance of claims 1-19 is respectfully solicited.

Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, he is requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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Attachment:
Appendix

Date: December 12, 2002

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DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461
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APPENDIX

Changes to Title:

The following is a marked-up version of the amended title:

VOLTAGE REGULATOR OF AC GENERATOR HAVING CIRCUIT FOR DETECTING
VOLTAGE INDUCED IN FIELD COIL~~VOLTAGE REGULATOR OF VEHICLE AC~~
GENERATOR

Changes to Claims:

1. (Amended) A voltage regulator of a vehicle AC generator including a rotor having a field coil and a plurality of magnetic poles and a stator having a stator core and an armature coil, said voltage regulator comprising:

a switching circuit, connected to said field coil, for supplying field current to said field coil in a controlled manner;

a field voltage detecting circuit for detecting field voltage induced in said field coil when said field coil is not supplied with field current; and

a switch control circuit, connected to said field voltage detecting circuit, for controlling said switching circuit according to said field voltage.

5. (Amended) A voltage regulator of a vehicle AC generator including a rotor having a field coil and a plurality of magnetic poles and a stator having a stator core and an armature coil, said voltage regulator comprising:

a field current switching circuit connected to said field coil;

a field voltage detecting circuit for detecting field voltage induced in said field coil when said field coil is not supplied with field current;

a control circuit, connected to said field voltage detecting circuit, for controlling said field current switching circuit according to an output voltage of said armature coil;

a power circuit for supplying electric power to said control circuit;
a power drive circuit for controlling supply of said electric power to said control circuit; and

first means for detecting rotation speed of said rotor according to said field voltage, wherein said power drive circuit supplies electric power from said power circuit to said control circuit if said rotation speed becomes as high as a predetermined speed.

15. (Amended) A voltage regulator of a vehicle AC generator including a rotor having a field coil and a plurality of magnetic poles and a stator having a stator core and an armature coil, said voltage regulator comprising:

a switching circuit for supplying field current to said field coil in a controlled manner;

means for detecting rotation speed of said rotor according to voltage induced in said field coil when said field coil is not supplied with field current; and

a switch control circuit, connected to said ~~field coil voltage detecting circuit~~means, for providing said switching circuit with electric power to be supplied to said field coil when said detected rotation speed becomes as high as a predetermined speed.

16. (Amended) The voltage regulator as claimed in claim ~~15~~15, wherein said means comprises first circuit means for providing field voltage induced in said field coil by residual magnetic flux of said stator core.